Groundwater Movement in Shallow Carbonate Rocks

Shallow carbonate bedrock (dolomite and limestone) underlies much of Northeastern Northwestern, and Southwestern Wisconsin (Figure 1).

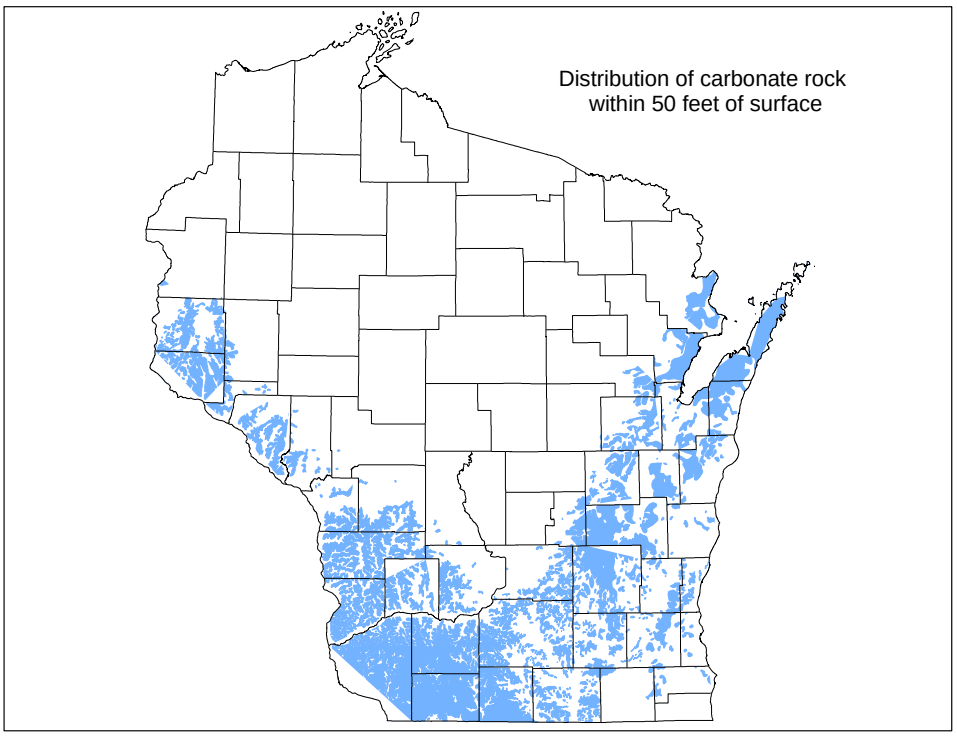

Figure 1: Location of shallow carbonate bedrock in Wisconsin

The WGNHS has conducted a series of projects to examine the hydrogeology of fractured carbonate rock in Wisconsin. In 2011, the WGNHS and UW-Oshkosh Geology Department received a Wisconsin Coastal Management Grant to develop a groundwater monitoring network around the Mink River Estuary in Door County. This pristine estuary is fed by springs originating in the fractured dolomite. The instrumentation phase of this project was completed in 2012. A second WCM grant is funding construction of a numerical groundwater flow model for the estuary, is scheduled for completion in June, 2013.

Over the past few years, the WGNHS has developed a program of research and public education on groundwater movement in fractured rocks and has provided assistance to various agencies facing carbonate-rock problems. During FY 2013, the WGNHS will continue such activities. WGNHS staff members are also involved in presenting professional short courses on fractured-rock hydrogeology.

Karst features, including a variety of sinkholes, cavities, and solution openings, commonly occur in carbonate rock (limestone and dolomite). Environmental problems associated with karst features include rapid groundwater contamination, unpredictable groundwater flow, difficulty in groundwater monitoring, and unexpected failure or collapse of surface structures such as roads and foundations. In recent years, there has been increased concern about the hazards and effects of karst features in many parts of Wisconsin but little published information has been available.

The WGNHS is serving as a clearinghouse for karst information and has begun assembling a karst database for the state. WGNHS scientists have conducted geophysical surveys near some of these features in order to characterize their depth and extent. The results of those studies have been used by municipalities for planning purposes and selecting options for sinkhole remediation. The WGNHS will continue to refine these geophysical techniques so that karst can be more effectively characterized across Wisconsin.

During FY 2014, the WGNHS will continue to provide data and consultation on karst issues as requested by various units of government and the public.